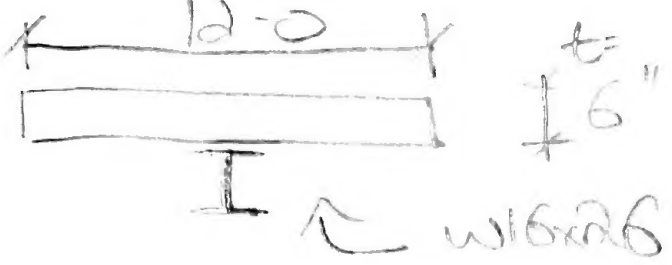
Deck

Ex 1



$A_s = 7.68$

$f'_c = 4{,}000$ psi

$$T = A_s F_y = (7.68 in^2)(50 ksi) = 384^k$$

$$A_s F_y = 0.85 f'_c b \times a$$

$$a = \frac{A_s F_y}{0.85 f'_c b} = \frac{384^k}{0.85(4)(12' \times 0")} = 0.78"$$

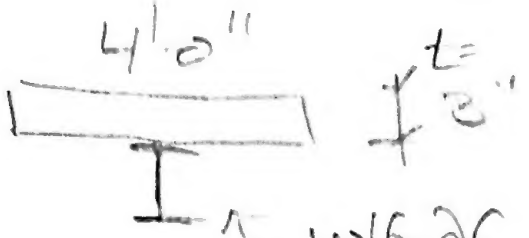
$$M_n = A_s F_y \left(d/2 + t - a/2\right)$$ ← SUM ABOUT TOS.

$$= 384\left(15.9/2 + 6" - 0.78/2\right) = 5807 k\text{-}in$$

$M_n = 434$ k-ft

$\phi M_n = 390$ k-ft

Ex 2



$f'_c = 3000$ psi

$A_s = 7.68$
$f_c = 3000$

$b_f = 5.5$ in
$t_f = 0.345$ in

$T = A_s F_y = 384^k$

$a = A_s F_y / 0.85 f'_c b = \frac{384^k}{0.85(3)(4\times12)}$

$a = 3.13" > t = 3$ N.G. → PNA IN STEEL

$$0.85 f'_c b t + F_y b_f \bar{y} = A_s F_y - F_y b_f \bar{y}$$

C_c C_s T_s (FULL SECTION) C_s (FLANGE FORCE)

$$\bar{y} = \frac{F_y A_s - 0.85 f'_c b_{eff} t}{2 F_y b_f}$$

$$\bar{y} = \frac{384 - 0.85(3)(48")(3)}{2(50)(5.5)} = 0.03"$$

$$\phi M_n = 0.85 f'_c b t(t/2) + F_y A_s(d/2) - 2F_y b_f \bar{y}(\bar{y}/2)$$

$$= 0.85(3)(48)(3)(3/2) + 384(15\tfrac{9}{12}) - 2(50)(5.5)(.03^2)$$

$$= 550 + 3053 - 0.25 = 3603$$

$$\phi M_n = 270 \text{ K-FT}$$